

HW-4 [CPE-6] [Week 9]

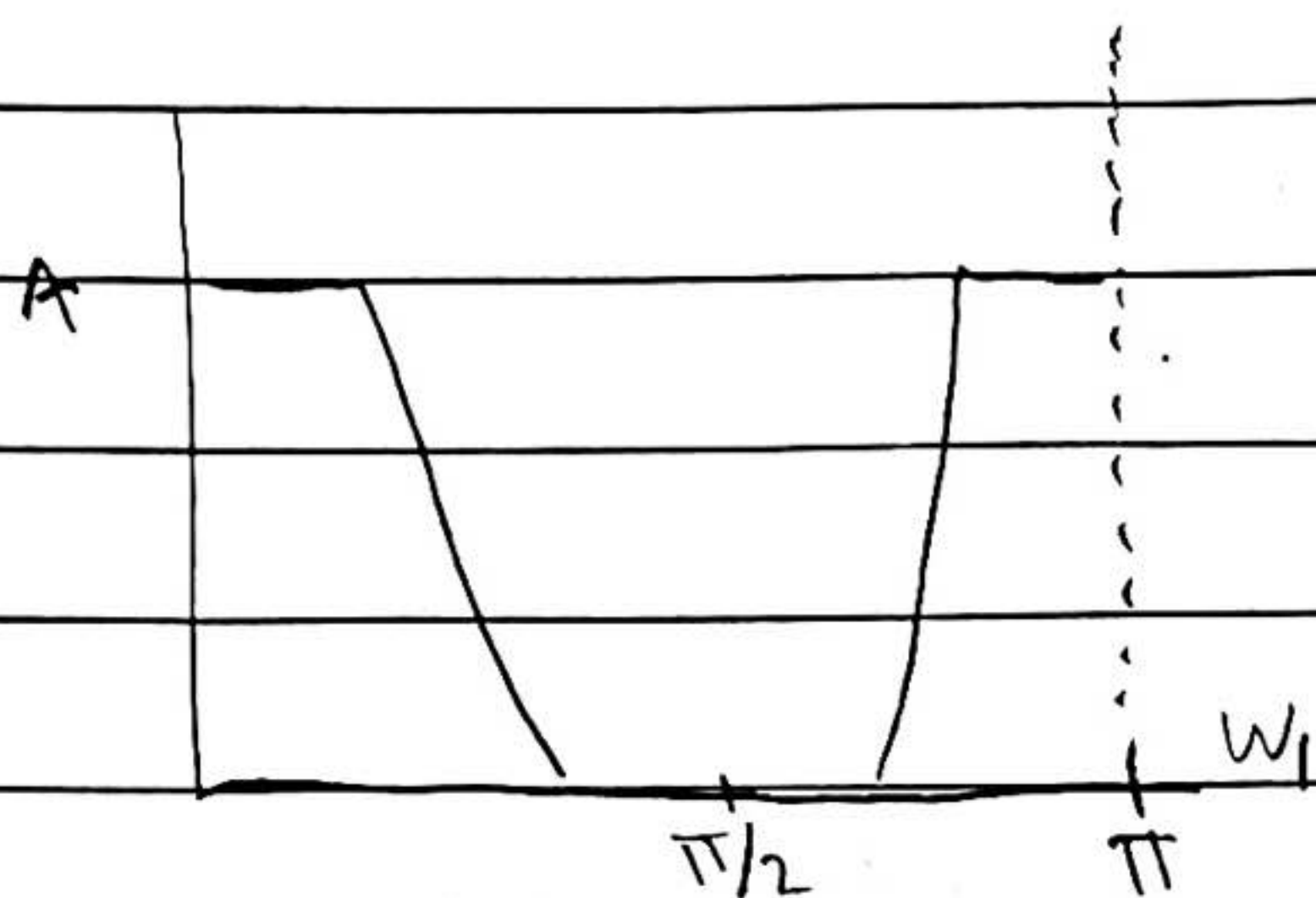
1)

$$x_d(t_1, t_2) = \int_{-T/2}^{T/2} (t_1 - v_1 \tau, t_2 - v_2 \tau) d\tau$$

$$x_d(\Omega_1, \Omega_2) = x(\Omega_1, \Omega_2) \frac{2 \sin(\Omega_1 v_1 \frac{(T-T_1)}{2})}{v_1 \Omega_1} \frac{2 \sin(\Omega_2 v_2 \frac{(T-T_2)}{2})}{v_2 \Omega_2}$$

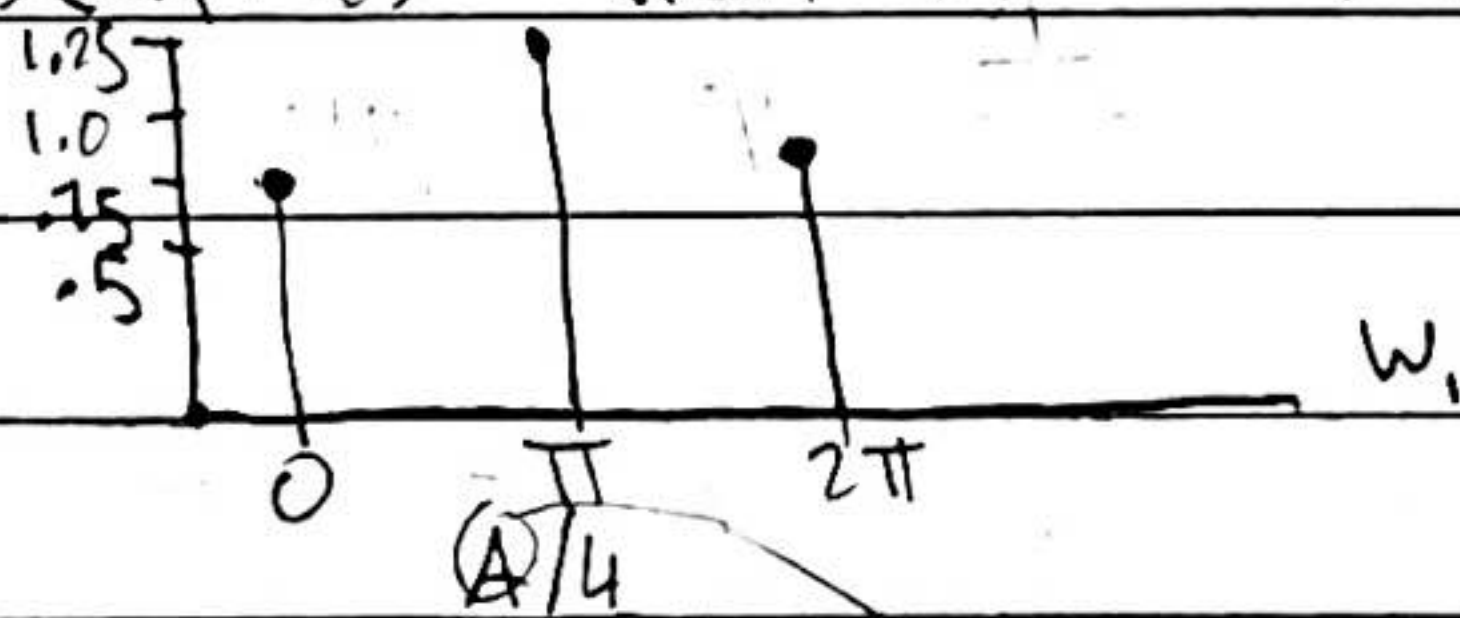
2)

$$H(w_1, w_2) = \frac{1}{1 - \frac{1}{4} e^{-jw_1}}$$



1) $S_{NN}(w_1, w_2) = 0$ [no noise]

$$G(w_1, w_2) = \frac{1}{H(w_1, w_2)} = \frac{1}{1 - .25e^{-jw_1}}$$



0 = .75
 $\pi = 1.25$
 $2\pi = .75$

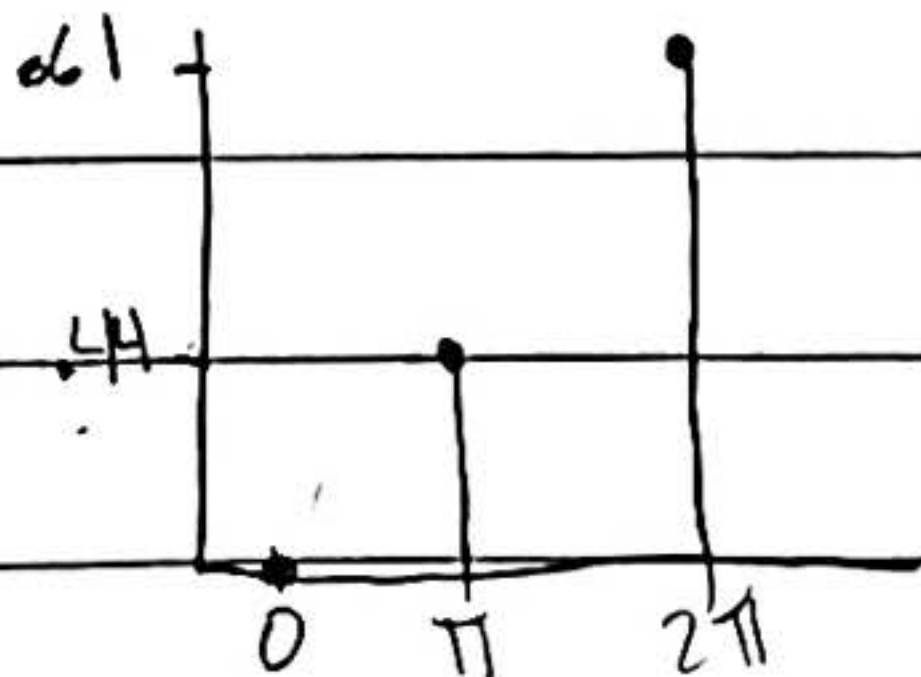
2)

$$G(w_1, w_2) = 1 + \frac{A}{4}$$

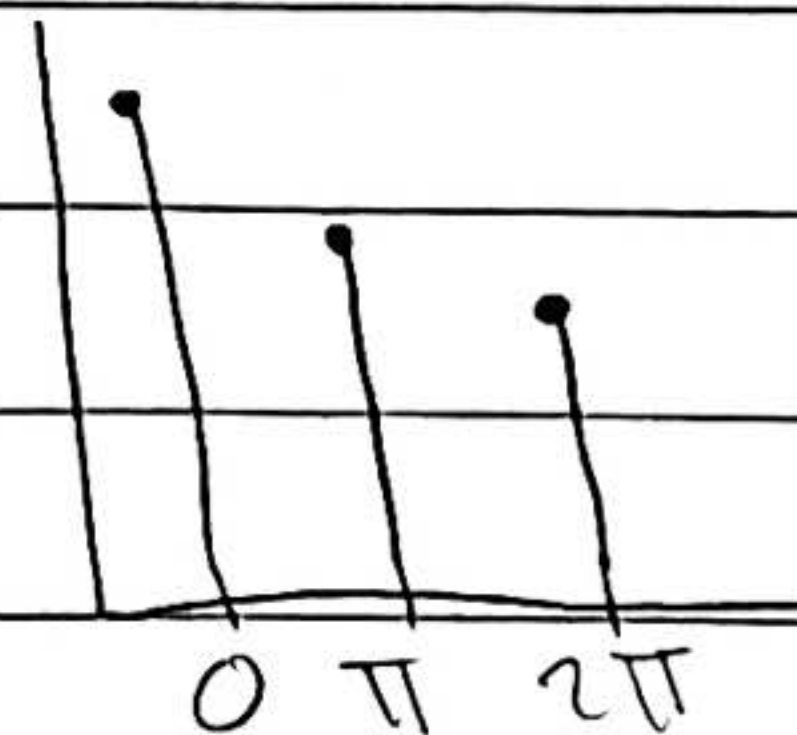
0 = 0

$\pi = .44$

$2\pi = .61$



3)



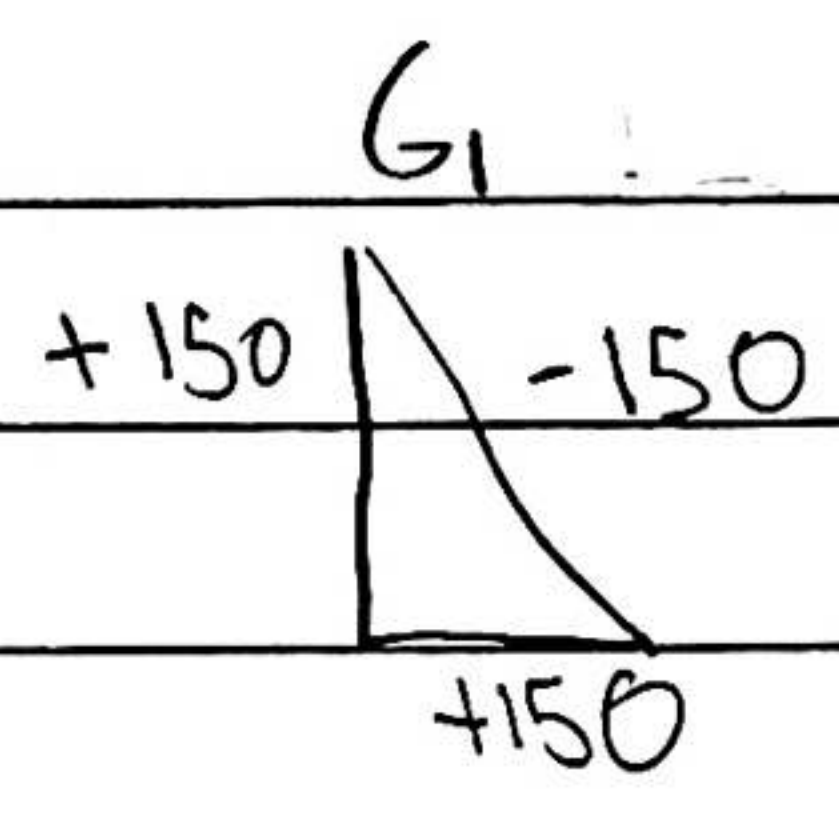
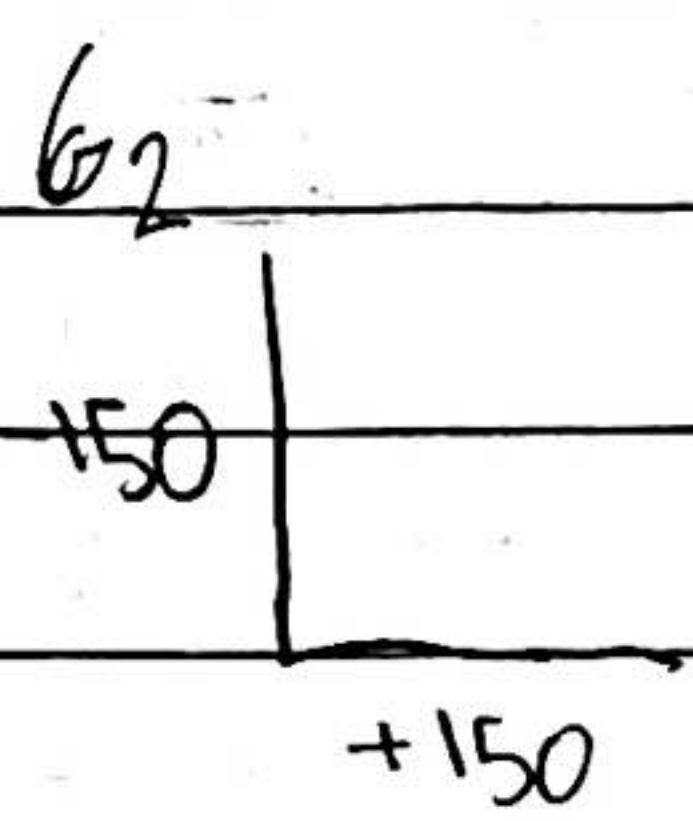
3)

$$1) \quad g[n_1, n_2] = \begin{cases} 255 \text{ (white)} & \text{if } y[n_1, n_2] \geq 100 \\ 0 \text{ (black)} & \text{if } y[n_1, n_2] < 100 \end{cases}$$

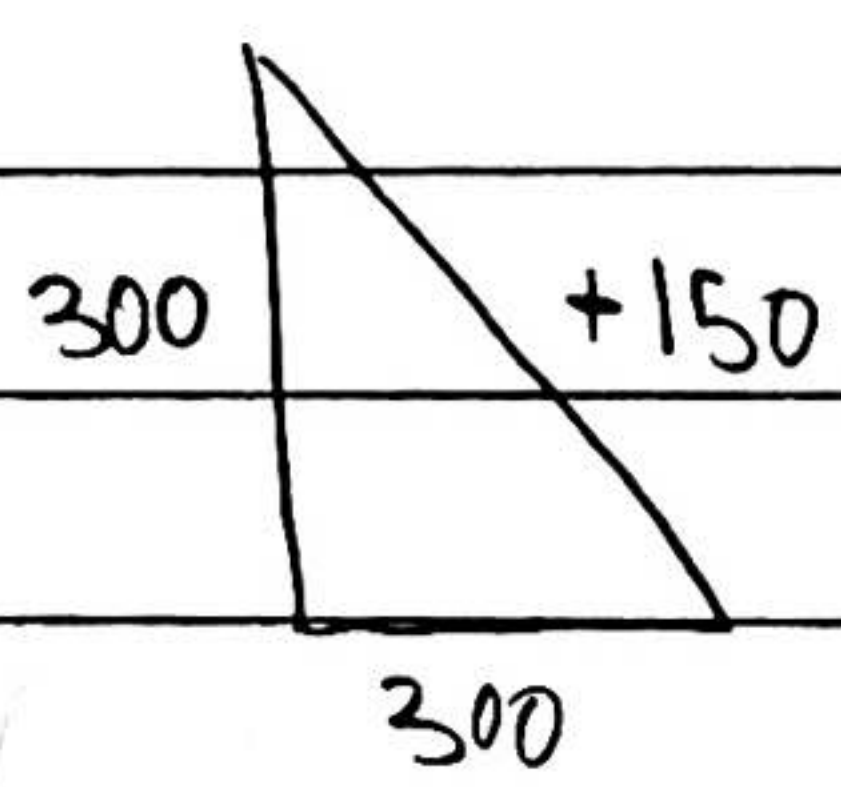
$$G_1(x[n_1, n_2]) = x[n_1 + 1, n_2 + 1] - x[n_1, n_2]$$

$$G_2(x[n_1, n_2]) = x[n_1, n_2 + 1] - x[n_1 + 1, n_2]$$

$$y[n_1, n_2] = |G_1| + |G_2|$$

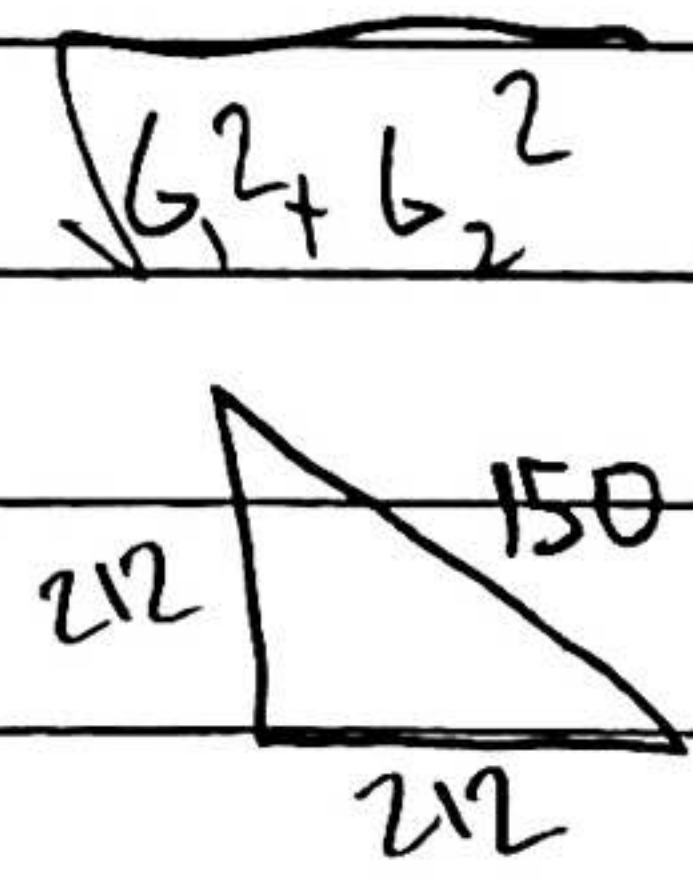
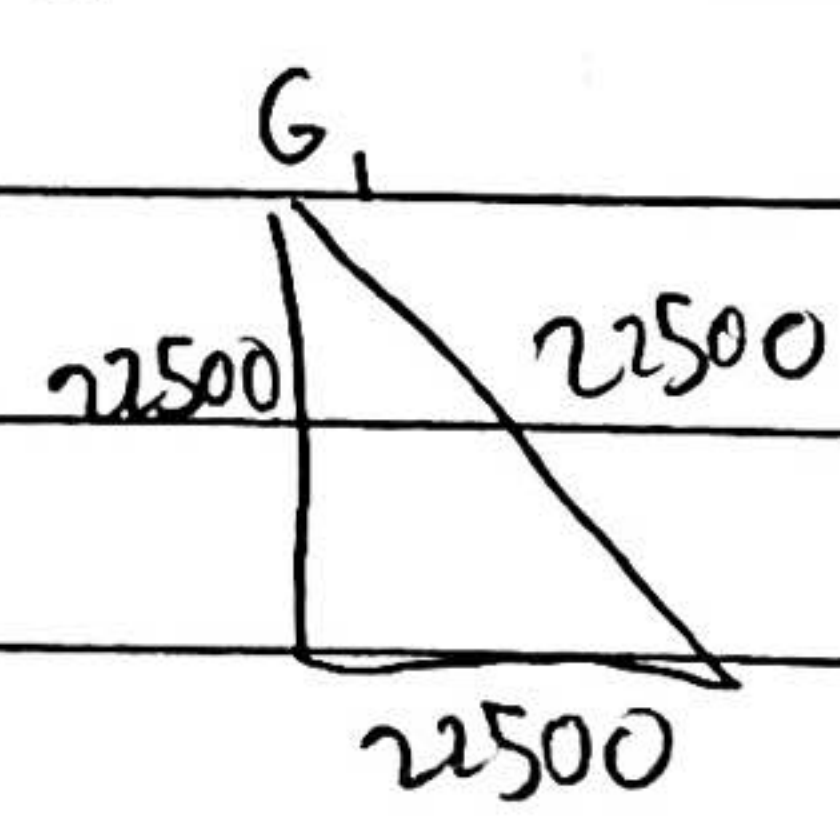
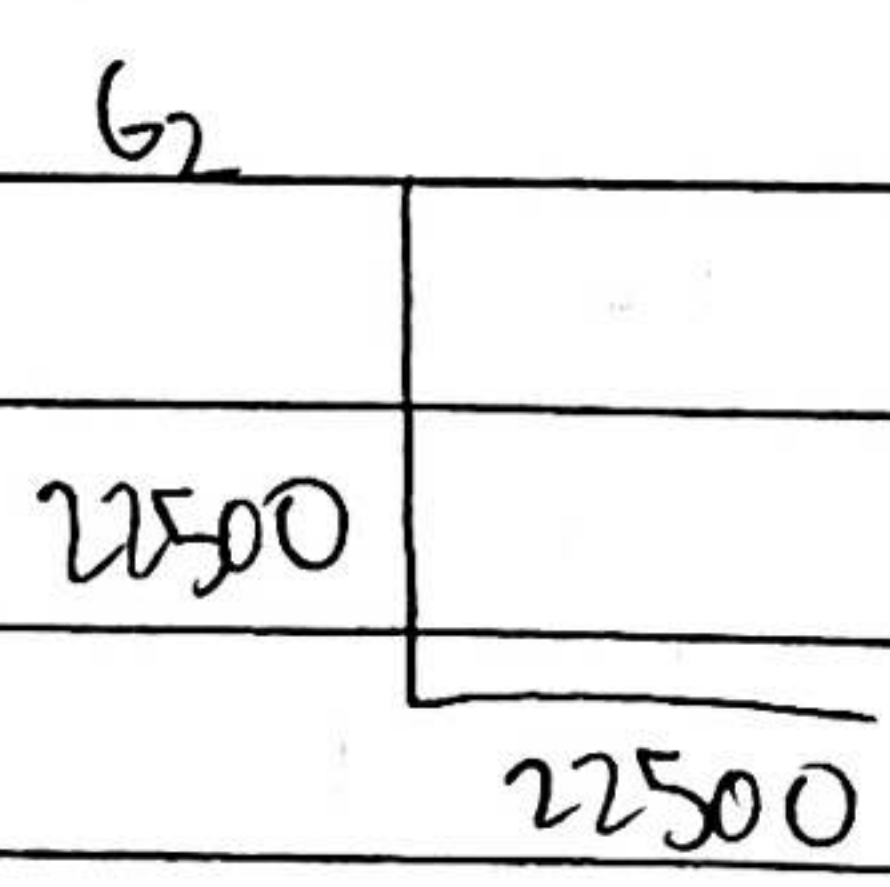


$$|G_1| + |G_2| =$$



$$T = 100$$

$$2) \quad y[n_1, n_2] = \sqrt{G_1^2 + G_2^2}$$



$$T = 100$$